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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/541,803

05/02/2006

Yong Xin Tao

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4237

4743

7590

03/10/2010

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EXAMINER

FLANIGAN, ALLEN J

ART UNIT

PAPER NUMBER

3744

MAIL DATE

DELIVERY MODE

03/10/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/541,803	Applicant(s) TAO ET AL.	
	Examiner Allen J. Flanigan	Art Unit 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) 7 and 15-24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08). | 6) <input type="checkbox"/> Other: _____ |

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Claims 7 and 15-24 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention or species, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 12/17/2009.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

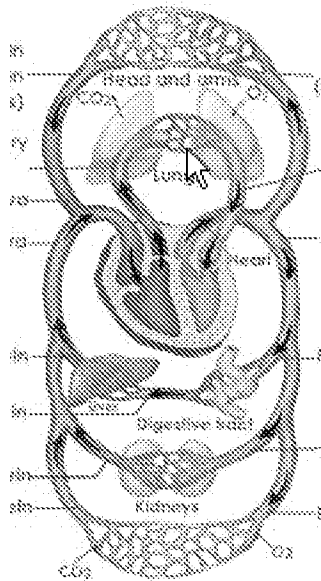
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5 and 8-14 are rejected under 35 U.S.C. 102(a, e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as being obvious over Pence et al.

Pence et al., like applicants, teach a heat sink device (thermal management device) with branching flow paths provided in both two and three dimensional arrays. The diameters of the passages in the branching networks get smaller as the number of branches get bigger, just as in applicants' claimed invention. The thermal management devices can potentially be made of laminated layers (see paragraph [39] of Pence et al.). The ratio of diameters can be such that the total cross sectional flow area increases as the flow passages increase in number, or as set forth in one embodiment, the total cross sectional area can remain relatively constant as the flow splits and recombines (see paragraph 29 of Pence et al. describing the Figs. 7A-7B embodiment). Even assuming that none of these specific examples falls within the numerical ranges set forth in claim 10, it would have been obvious to provide ratios within the claimed range, as the relative diameters are recognized as result-effective variables, whose optimization would have been obvious.

Note in regard to claim 1 that Pence et al. are deemed to teach the use of such branched arrays on both the supply and delivery side of thermal management devices; paragraph [32] of Pence et al. describes the Fig. 8 embodiment as showing "micro channel arrays configured to receive a fluid from or deliver a fluid to a branching network". Also, the model upon which these branching networks are based is the physiological model of a mammalian circulatory system, which includes such recombining of branches towards the outlet side.

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Recitations in the claims concerning "sacrificial material" and the manner in which it is intended to be removed concern the intended method of making the device, and thus cannot distinguish the finished product. It does not matter what the fugitive material may be that is used to form the channels or how it is removed (etching, firing, etc.) since the resulting structure will be the same, and will be devoid of any removed sacrificial material. See MPEP 2113.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-5, 8, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pence et al. in view of Zwittig.

Assuming *arguendo* that Pence et al. does not fairly teach or suggest branching the passages on the outlet side as well as the inlet side of thermal management devices, it would have been obvious to do so as Zwittig shows that it is known to do this in laminated plate heat sink devices with small, branched, parallel flow passages (see Fig. 10, for example).

Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Pence et al. in view of O'Neill and Li, or Pence et al. in view of Zwittig, O'Neill and Li.

Ordinarily, a change in material is considered an obvious modification. See ***Hotchkiss v. Greenwood*, 11 How. 248**. Pence et al. mentions brass and stainless steel as potential materials; however, it is known to use silver as a heat sink fabrication material, since it has the highest thermal conductivity of all metals (see Li, last paragraph of column 23, see O'Neill, last paragraph of column 3). Thus, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to fabricate the heat sink/thermal management device of Pence et al. (or Pence et al. as modified in view of Zwittig) out of silver due to its high thermal conductivity.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Gruber et al. shows branched heat sink fluid passages of different diameters.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Allen J. Flanigan whose telephone number is (571) 272-4910. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on (571) 272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Allen J. Flanigan/
Primary Examiner, Art Unit 3744